

Appl. No. : 10/642,952  
Filed : August 18, 2003

### AMENDMENTS TO THE CLAIMS

Please amend the Claim Form and Claim as follows. Insertions are shown underlined while deletions are ~~struck through~~.

1 (currently amended): A process for producing dimethyl ether comprising:

removing a sodium oxide from a starting material of an activated alumina or from the activated alumina after being shaped, to obtain an activated alumina catalyst having a sodium oxide content of 0.07% by weight or less, said activated alumina catalyst having an average pore radius of 2.5 nm to 8.0 nm; and

dehydrating methanol in vapor phase in the presence of an~~the~~ activated alumina catalyst having an average pore radius of at least 2.5 nm and at most 8.0 nm and having a sodium oxide content of at most 0.07 % by weight, thereby producing dimethyl ether.

2 (original): The process according to Claim 1, wherein the activated alumina catalyst is a  $\gamma$ -alumina catalyst.

3 (original): The process according to Claim 1, wherein the sodium oxide content in the activated alumina catalyst is at most 0.05 % by weight.

4 (original): The process according to Claim 1, wherein neither water nor steam is added to the dehydration reaction system.

5 (original): The process according to Claim 1, wherein no active component other than the activated alumina is added to the activated alumina catalyst.

6 (original): The process according to Claim 1, wherein the dehydration is conducted at a pressure of at least 0.0 MPa-G and at most 3.0 MPa-G.

7 (original): The process according to Claim 1, wherein the dehydration is conducted at a pressure of at least 1.0 MPa-G and at most 2.5 MPa-G.

8 (new): The process according to Claim 1, wherein the sodium oxide content in the activated alumina catalyst is at most 0.04% by weight.

9 (new): The process according to Claim 1, wherein the removal of a sodium oxide is accomplished by washing with an acid.

10 (new): The process according to Claim 1, wherein the activated alumina catalyst has a pore volume of 0.45 mL/g or less.

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11 (new): The process according to Claim 1, wherein the average pore radius is at least 2.5 nm and less than 5.0 nm.

12 (new): The process according to Claim 5, wherein the average pore radius is at least 2.5 nm and less than 5.0 nm.

13 (new): A method for producing dimethyl ether comprising:

obtaining an activated alumina catalyst by using as criteria its sodium oxide content and its average pore radius, wherein the sodium oxide content is 0.07% by weight or less and the average pore radius is 2.5 nm to 8.0 nm; and

dehydrating methanol in vapor phase in the presence of the activated alumina catalyst, thereby producing dimethyl ether.

14 (new): The method according to Claim 13, wherein the activated alumina catalyst is a  $\gamma$ -alumina catalyst.

15 (new): The method according to Claim 13, wherein the sodium oxide content in the activated alumina catalyst is at most 0.05% by weight.

16 (new): The method according to Claim 13, wherein the sodium oxide content in the activated alumina catalyst is at most 0.04% by weight.

17 (new): The method according to Claim 13, wherein neither water nor steam is added in the dehydration step.

18 (new): The method according to Claim 13, wherein no active component other than the activated alumina is added to the activated alumina catalyst.

19 (new): The method according to Claim 13, wherein the dehydration is conducted at a pressure of at least 0.0 MPa-G and at most 3.0 MPa-G.

20 (new): The method according to Claim 13, wherein the dehydration is conducted at a pressure of at least 1.0 MPa-G and at most 2.5 MPa-G.

21 (new): The method according to Claim 13, wherein the activated alumina catalyst has a pore volume of 0.45 mL/g or less.

22 (new): The method according to Claim 13, wherein the average pore radius is at least 2.5 nm and less than 5.0 nm.

23 (new): The method according to Claim 18, wherein the average pore radius is at least 2.5 nm and less than 5.0 nm.

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24 (new): A method for producing dimethyl ether comprising:

providing an activated alumina catalyst having a sodium oxide content of 0.07% by weight or less and an average pore radius of 2.5 nm to 8.0 nm; and

dehydrating methanol in vapor phase in the presence of the activated alumina catalyst, thereby producing dimethyl ether at a conversion ratio of methanol to dimethyl ether, which ratio is increased as a function of the sodium oxide content and the average pore radius of the activated alumina catalyst.

25 (new): The method according to Claim 24, wherein the activated alumina catalyst is a  $\gamma$ -alumina catalyst.

26 (new): The method according to Claim 24, wherein the sodium oxide content in the activated alumina catalyst is at most 0.05% by weight.

27 (new): The method according to Claim 24, wherein the sodium oxide content in the activated alumina catalyst is at most 0.04% by weight.

28 (new): The method according to Claim 24, wherein neither water nor steam is added in the dehydration step.

29 (new): The method according to Claim 24, wherein no active component other than the activated alumina is added to the activated alumina catalyst.

30 (new): The method according to Claim 24, wherein the dehydration is conducted at a pressure of at least 0.0 MPa-G and at most 3.0 MPa-G.

31 (new): The method according to Claim 24, wherein the dehydration is conducted at a pressure of at least 1.0 MPa-G and at most 2.5 MPa-G.

32 (new): The method according to Claim 24, wherein the activated alumina catalyst has a pore volume of 0.45 mL/g or less.

33 (new): The method according to Claim 24, wherein the average pore radius is at least 2.5 nm and less than 5.0 nm.

34 (new): The method according to Claim 29, wherein the average pore radius is at least 2.5 nm and less than 5.0 nm.